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Applicant(s) for EO/US:	Nurakhmed Nurislamovich LATYPOV Nurulla Nurislamovich LATYPOV
Title of Invention:	METHOD FOR CREATING VIDEO PROGRAMS (VARIANTS) AND SYSTEM FOR IMPLEMENTING THE METHOD
Attorney Docket No.	47254-00004

Box DO/EO/US
Assistant Commissioner for Patents
Washington, D.C. 20231

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Type or Print Name ..... Carla Elkins

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Madam or Sir:

REQUEST FOR PCT NATIONAL ENTRY IN THE US
UNDER 35 U.S.C. §371 AND 37 CFR §1.495

This is an express request to begin national examination procedures of International Application Number PCT/RU99/00319 under 35 U.S.C. §371 and 37 CFR §1.495 in the United States Patent and Trademark Office.

Patent Application

Attorney Docket No. 47254-00004

1. ☒ Enclosed are 20 pages of the specification, 7 pages of claims, and 2 pages containing the abstract of International Application No. PCT/RU99/00319 as published.

2. ☒ Two sheets of formal drawings (as published in connection with PCT/RU99/00319) are enclosed.

3. ☒ The name(s), mailing address(es) and citizenship of the inventor(s) for this national application are not known to have changed since the publication of the International Application, and specifically are last known to be as follows:

Inventor	Name	Address	Citizen of (Country)
(1)	Nurakhmed Nurislamovich LATYPOV	5 Voikovsky proezd, d. 10, kv. 31 Moscow, 125171 RUSSIA	Russian Federation
(2)	Nurulla Nurislamovich LATYPOV	5 Voikovsky proezd, d. 10, kv. 31 Moscow, 125171 RUSSIA	Russian Federation

4. ☒ The International Bureau confirmed that it had received a certified copy of priority application RU 98116685 as filed on September 4, 1998 during the international stage of this PCT application by mailing Form PCT/IB/304 to the Applicant indicating such.

5. ☒ A proper Demand for International Preliminary Examination of the international application was made by the 19th month from the earliest claimed priority date. The United States was elected in the Demand. The International Bureau reported to the Applicant(s) that it had notified the EO/US in accordance with PCT Article 31(7) of its election for Chapter II proceedings.

6. ☒ Combined Declaration and Power of Attorney executed by the inventor(s).

7. ☒ An Information Disclosure Statement Under 37 CFR §1.97(b) is enclosed, along with PTO Form 1449 and a copy of each reference identified on PTO Form 1449.

8. ☐ A Preliminary Amendment is enclosed.

9. ☐ The International Application was filed and examined in the English language.

10. ☒ A translation of the International Application as published into English (35 U.S.C. §371(c)(2)) is enclosed (21 pages).

11. ☐ A translation of the amendment(s) to the International Application under PCT Article 19 into English (35 U.S.C. §371(c)(3)) is(are) enclosed. **(Note: No Article 19 Amendment was filed in connection with PCT/RU99/00319.)**

12. ☐ A translation of the annex(es) to the International Preliminary Examination Report made under PCT Article 36 into English (35 U.S.C. §371(c)(5)) is(are) enclosed. **(Note: No Article 34 Amendments was filed in connection with PCT/RU99/00319.)**

13. ☒ Translation(s) of the following additional PCT documents is/are enclosed:

Conclusion on the International Preliminary Examination (1 page).

14. ☐ A Petition to Make Special For New Application Under MPEP §708.02, VIII is enclosed, along with PTO Form 1449, and a copy of each reference identified on PTO Form 1449.

15. ☒ This entity and/or independent inventor qualifies for small entity status under 37 CFR §1.9(f) and/or §1.27(b). The following supportive documentation reflecting such is attached: Declaration executed by both inventors on February 16, 2001 (1 page).

Patent Application **Attorney Docket No. 47254-00004**

16. ☒ In determining the Basic Fee, the following aspects of the progression of the PCT application were considered:

Searching Authority Russian Patent Office

Examining Authority Russian Patent Office.

17. ☒ The filing fee is calculated by adding the appropriate Basic Fee to the fees for the number and types of claims presented for national entry under 37 U.S.C. §371, specifically:

FOR	NUMBER	NUMBER EXTRA	RATE	CALCULATION
TOTAL CLAIMS	21 -20=	1	x $ 18.00 =	$ 18.00
INDEPENDENT CLAIMS	4 -3=	1	x $ 80.00 =	$ 80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			x $ 270 =	$ 270.00
			BASIC FEE	+ $ 1000.00
		TOTAL OF ABOVE CALCULATIONS =		$ 1368.00
REDUCTION BY ½ FOR FILING BY SMALL ENTITY (Note 37 C.F.R. 1.9, 1.27, 1.28).				-684.00
			Total =	$ 684.00

18. ☒ A check in the amount of $684.00 for the application fee is enclosed.

19. ☒ The Commissioner is hereby authorized to charge fees under 37 C.F.R. §1.16 and §1.17 which may be required, or credit any overpayment to Deposit Account No. 10-0447, reference 47254-00004. A duplicate copy of this sheet is enclosed.

20. ☒ Address all future communications to:

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21. ☒ Also enclosed:

1. Copy of Forms IPEA/416 and IPEA/409 in their entirety as prepared in the Russian language (4 pages);
2. Certificate of Mailing by Express Mail with Express Mail Receipt No. EL 487169873 US; and
2. Confirmation Postcard.

Respectfully submitted,
JENKENS & GILCHRIST, P.C.

Robert W. Mason

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Date: March 1, 2001

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Docket No. 47254-00004

Serial or Patent No.: _____ OFGS File No. _____
Filing or Issue Date: _____
Applicant or Patentee: LATYPOV Nurakhmed Nurislamovich, LATYPOV Nurulla Nurislamovich
For: METHOD FOR CREATING VIDEO PROGRAMS (VARIANTS) AND SYSTEM FOR IMPLEMENTING THE METHOD

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
37 CFR 1.9(f) and 1.27(b) - INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under 35 USC §41(a) and (b) to the U.S. Patent and Trademark Office with regard to the invention entitled METHOD FOR CREATING VIDEO PROGRAMS (VARIANTS) AND SYSTEM FOR IMPLEMENTING THE METHOD described in

[x] U.S. Patent Application filed herewith
[ ] U.S. Patent Application Serial No. _____ filed _____
[ ] U.S. Patent No. _____ issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed or licensed or am under an obligation under contract or law to assign, grant, convey or license any rights in the invention is listed below:

[x] no such person, concern or organization
[ ] persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. 37 CFR 1.27

FULL NAME: _____
ADDRESS: _____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION
NAME: _____
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I acknowledge the duty to file in this patent application or patent, notification of any change of status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. 37 CFR 1.29(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC §1001, and that such willful false statements may jeopardize the validity of the patent application, any patent issuing thereon, or any patent to which this verified statement is directed.

LATYPOV Nurakhmed Nurislamovich	LATYPOV Nurulla Nurislamovich	
Name of Inventor	Name of Inventor	Name of Inventor
Signature of Inventor	Signature of Inventor	Signature of Inventor
16.02.2001	16.02.2001	
Date	Date	Date

METHOD FOR CREATING VIDEO PROGRAMS (VARIANTS) AND SYSTEM FOR IMPLEMENTING THE METHOD

Field of the Invention

The present invention relates to television, including interactive television, user interfaces, video conferences, telecommunication networks and, more concretely, to a method and system for creating video programs, including game show-programs with interactive interaction between actors and objects generated by a computer program.

Background Art

A method and a system for creating video programs are known, wherein images alternate and are shown in separate windows (window interface, picture in picture). In order to do this a participant of a video program is shot with a video camera, an image is formed with the aid of computer with according software and the formed image is displayed to the participant. The video image and the computer image are displayed to viewers sequentially or simultaneously in different windows of one screen, wherein the image in one of the windows does not obviously depend on what is in the other.

Also widely known is a method for creating video programs, in which a user-participant of a video program and an image generated by a computer are shot in the process of interaction of the user with the computer. Wherein, different variants of shooting the user are used, which differ by the selection of the angle of approach and the montage. When a shot is taken from the direction of the computer, the viewers may observe the emotions of the user-participant of the video program, the user's actions, but the computer screen and the reaction of computer programs' objects to the user's actions are not seen. If the shooting is conducted with a show of the computer screen, viewers may additionally observe only the back of the user's head, and do not see his emotions, mimics, reactions and gestures. The most widely spread variant is shooting from the side when the screen is partially seen, the obtained image on the screen as a rule being of low quality, and whereby the user is seen in profile. In other variants of shooting, post-shooting montage is used, when several pictures shot at different angles of approach are combined on a divided screen. In the case of specialized television programs which are based on the interaction of a user with objects of a computer program (games, problems, tests, teaching), this method is not sufficiently effective. The described approaches do not

ensure the display of the objects of the user, the program and the process of their interaction on one screen.

A system is known for creating video programs, comprising a video camera coupled to a unit for combining images, a computer with a unit for generating images, also coupled to the unit for combining images, which has an output for a video signal suitable for recording or broadcasting (see the magazine "Seti," June 1998, publisher "Otkrytye Sistemi," pp. 52-56). The known system makes it possible to create video images in accordance with the methods described above. This system does not provide for the formation of an image showing the user interacting with objects of the computer program with which the user interacts in the shooting process.

A method is known for creating video programs for remotely spaced one from another participants (video conference mode), wherein video cameras are used to form a video image of users of computers which are interconnected by means of a telecommunication network and use, as a rule, one and the same software or work with one application (see the magazine "LAN," June 1998, v. 4, publisher "Otkrytye Sistemi," pp. 81-86). A video image of a participant of the video conference is sent through the network and is output in a separate window (frame in frame), superimposed on the main window in one of the corners. Such a method for remote interaction with the possibility of seeing and hearing a partner makes it possible to jointly solve different problems. A drawback of this method is the visual inconsistency of the user-partner's reaction displayed in the separate window with the image on the main screen and with changes of that image. The partner of the video conference here acts as an external adviser, and not as a co-participant of the actions which are occurring on the main screen. Wherein, if the changes take place dynamically and several objects are shown simultaneously, it is not possible to identify the partner's reaction to a change of separate objects displayed on the main screen.

Disclosure of the Invention

The object of the instant invention is to create methods and a system for shooting video programs of the type described above, which provide the possibility of shooting a participant of a video program in the process of the participant's interaction with displayed objects of a computer program in such a manner that viewers could watch on a screen the participant's reaction to changes in the computer program, the participant's mimics, gestures and simultaneously watch the results of operation of the computer program on the same screen.

The technical result being achieved is enhancement of the quality of the created video programs by increasing the reliability and quality of displaying to the viewers images formed by the computer and the reaction of the actor-participant to a change of these images. Furthermore, the quality of the created images is enhanced by the possibility which the invention provides for displaying images formed by the computer of objects of the computer programs with which a participant of the video program interacts in the space between the participant and the viewer, as a result of which the effect of viewers' participation in the onrolling performance is created, the impressiveness and attractiveness of the video program are enhanced, which promotes an increase of the viewers' interest in video programs created in this manner, wherein the video programs may be used for a study of the process of interaction of a participant with objects generated by the computer.

The indicated technical result is achieved in that in a method for creating video programs, which is based on video shooting and forming computer images, wherein an image is formed by a computer, which includes an image of objects in the foreground and a background image, shooting a participant of the video program is carried out with a video camera and a corresponding video image is obtained, an output video signal is formed with use of the video image of the participant of the video program and the image formed by the computer, in accordance with the invention at least objects of the foreground of the image formed by the computer are displayed to the participant of the video program, shooting the participant of the video program is carried out in the process of displaying at least objects of the foreground of the image formed by the computer to the participant of the video program with an angle of approach of the shooting providing the possibility of reproducing in the obtained video image the reaction of the participant of the video program to the displayed objects of the computer program, the image formed by the computer is combined with the video image of the participant of the video program by superimposing an image of at least the objects of the foreground on the video image of the participant, and the combined image is used for subsequent display to the user.

Wherein it is preferable that the shooting of the participant of the video program be carried out on a chromakey background, and when the image of the objects of the foreground, which are formed by the computer, is combined with the video image of the participant of the video program, the chromakey background is replaced with the aforementioned background image or with any other image, wherewith the participant of

the video program is provided with the possibility of interacting with the displayed objects formed by the computer, and of changing the image of the aforesaid objects.

It is also preferable, that at least the video image of a participant of a video program, which is shot by a video camera in a studio, and data necessary for forming an image with a computer are transmitted via a telecommunication network to a user device, an image is formed in the user device on the basis of data received from the studio, this image including an image of the objects of the foreground and a background image, the video image of the participant of the video program and the image formed by the user device are combined by superimposing the image of the objects of the foreground onto the video image of the participant, and displaying the combined image to the user.

Wherein, an input of control commands used to form the image in the user device may be carried out in the user device, the control commands are transmitted through the telecommunication network into the studio and are used to form an image by the computer.

Shooting a user with a video camera, transmitting a video image of the user through a telecommunication network into a studio, combining the video image of the user received in the studio with objects of the foreground by superimposing an image of these objects on the video image of the user, and displaying the combined image to a participant of the video program, which combined image may be used for display to other users, may additionally be carried out.

The indicated technical result is also achieved in that a system for creating video programs, combining shooting with a video camera and forming images with a computer, primarily television programs, the system comprising a video camera for shooting a participant of a video program and a means for forming an image including objects of the foreground and a background image, the video camera and the means being disposed in a studio, in accordance with the invention comprises a means for displaying at least objects of the foreground to the participant, the means for displaying being connected to the means for forming an image, and a means for combining images, a first input of which is connected to an output of the video camera, a second input to an output of the means for forming an image, wherein the aforesaid means for combining images is made with the possibility of superimposing an image of objects of the foreground on a video image of the participant. It is preferable that the clothes of the participant (participants) be of a neutral color or of colors which do not coincide with those of the objects, then the objects will not blend with the background (with the participant).

Wherewith the means for displaying is preferably made so that the image displayed to the participant intersects the line of shooting. In particular, the aforesaid means for displaying preferably comprises a screen, coupled to a means for forming images and disposed outside the limits of the field of view of a video camera, and a semitransparent mirror, optically conjugated with the aforesaid screen and disposed on the line of shooting the participant with the video camera, at an angle to the aforesaid line to provide the possibility of forming a reflected image displayed to the participant in a plane substantially perpendicular to the line of shooting.

Furthermore, the system preferably comprises a means for interactive interaction of the participant with objects of the displayed image, the means being coupled to the means for forming an image, and made, for example, in the form of a means for determining the position and orientation of the participant.

In one of the embodiments the system additionally comprises a channel of a telecommunication network, a connection unit coupled by two-way communication to the channel of the telecommunication network, to a means for forming an image and to a means for combining images, and at least one user device comprising a user means for forming an image of the objects in the foreground and a background image, a user connection unit coupled by two-way communication to the channel of the telecommunication network and to the user means for forming an image, a user means for combining images of the foreground with a video image of a participant of a video program sent over a channel of the telecommunication network and made with the possibility of superimposing the image of the objects in the foreground on the video image of a participant of the video program and a user means for displaying the combined image, wherein a first input of the user means for combining the images is connected to an output of the user connection unit, a second input is connected to an output of the means for forming images, and an output is connected to an input of the unit for displaying a combined image.

In the indicated embodiment the system preferably also comprises a user control unit, an output of which is connected to a corresponding input of the user connection unit, and/or a user control command processing unit disposed in the studio and connected by two-way communication to the connection unit and to the means for forming the image.

The indicated technical result is also provided in that in a method for creating video programs in a video conference mode based on video shooting and forming images with a computer, wherein an image is formed by computers for each of at least two spatially

separated participants of a video program, the image including an image of the objects of the foreground and a background image, wherein the aforesaid computers are linked through a telecommunication network, at least the image of the foreground objects, formed by a computer, is displayed to each of the participants of the video program, the possibility of interacting with the displayed objects and changing the displayed objects is provided to each of the participants of the video program, shooting each of at least two participants of the video program is carried out with a video camera, a video image of each participant is sent through the telecommunication network and displayed to the other participant, in accordance with the invention the shooting of each participant of the video program is carried out in the process of the participant's interaction with at least the objects of the foreground of the image formed by a computer, the image of the foreground objects which are displayed to a particular participant is combined for each of the participants with a video image received of another participant of the video program by superposing the aforesaid image of the foreground objects on the aforesaid received video image of the participant of the video program and a combined video image is displayed to each of the participants of the video program, wherein the background, on which a participant of the video program is shot with a video camera, is cleaned from the received video image and replaced with a background image formed by a computer or by any other image.

Furthermore, the technical result indicated above is achieved in that in a method for creating video programs for registering the reaction of a user to a presented image for studying and optimizing interfaces of computer programs and editing video films, wherein an image is formed, the formed image is displayed to the user, the user is shot with a video camera and a corresponding video image is obtained, an output video signal is formed with use of the video image of the user and the formed image for subsequent analysis, in accordance with the invention, the shooting of the user is carried out in the process of displaying the formed image to the user with an angle of approach of the shooting which provides the possibility of reproducing in the obtained video image a reaction of the user to the image displayed to the user, transparent zones are created in the image being formed, the formed image is combined with the video image of the user by superimposing the formed image with the transparent zones on the video image of the user.

Wherein, the image formed by the computer comprises an image of the objects and a background image, the background image being formed transparent when combined with the video image of the user.

Furthermore, the user is provided with the possibility of interacting with the objects of the displayed image formed by the computer.

It is useful to additionally register data of the psychophysiological condition of a user in the process of displaying the formed image to the user, wherein the indications of the registered data are combined with the images of the video program.

Brief Description of the Drawings

The invention is explained with examples of embodiment illustrated with drawings.

Fig. 1 shows a block diagram of a system for creating video programs, in accordance with the invention.

Fig. 2 shows embodiments of realizing the means for displaying an image formed by a computer to a participant of a video program.

Fig. 3 shows a block diagram of a system for creating video programs, which provides the possibility for interactive interaction of a user with a participant of a video program and/or with objects generated by a computer.

Fig. 4 shows a block diagram of a system for creating video programs in a video conference mode.

Embodiments of the Invention

A system for creating video programs, primarily TV programs, shown in Fig. 1, comprises a video camera 1, serving to shoot a participant 2 of a video program, a means 3 for forming an image to be displayed to the participant 2 with the aid of a means 4 for displaying, a unit 5 for combining images, one input of which is connected to an output of the video camera 1, another input - to an output of the means 3 for forming an image, and an output of the unit 5 for combining images is an output of a finally formed video signal which may be used for transmission to user terminals (not shown in Fig. 1). An input of the means 3 for forming an image is connected to an output of a means 6 for interaction of a participant 2 of a video program with objects formed by the means 3 (computer). All possible manipulators and sensors - mouse, joystick, keyboard, transparent sensor screen, virtual gloves, game consoles, sensors of body part movements, microphone for receiving vocal commands, may be used as the means 6 for interaction.

Embodiments of realization of the means 4 for displaying an image formed by the means 3 are shown in Fig. 2 (a)-(d). Fig. 2 (a) shows a screen 7, for example, a monitor screen on which images formed by the means 3 are displayed. The screen 7 is set in such

a manner that it does not obstruct the shooting of a participant, i.e. is outside the field of view of the video camera. A glass plate 8 (or a semitransparent mirror), forming a false (or real) image 7' is mounted on the shooting line O-O', passing through the video camera 1 and the participant 2, at an angle to the line O-O', preferably at an angle of about 90 degrees to the line O-O', in accordance with how the display of a standard display means is oriented.

An embodiment of the means 4 for displaying is shown in Fig. 2 (b) for the cases of shooting the participant at full height (view from above). In this embodiment the means 4 for displaying comprises a screen 7, mounted outside the field of view of the video camera 1, a semitransparent mirror 8, mounted on the shooting line O-O', and a projector 9, coupled to a means 3 for forming an image and optically conjugated with the screen 7.

Embodiments are shown in Figs. 2 (c) and (d) for realization of the means 4 for displaying for outside-studio use. In the variant according to Fig. 2 (c), the means 4 for displaying is a standard monitor 10, on which a small-size video camera 11 is mounted, put forward of a monitor 10 screen and providing a video conference mode. The binocularity of a user's sight ensures that the video camera 11 will not close any of the objects of the image simultaneously for both eyes of the user. In the variant according to Fig. 2 (d) a notebook monitor 12, positioned in the same plane as its keyboard 13, serves as the display means 4. The image from the monitor 12 is displayed to the user through the plane 8, thus creating a false image 12'.

The system for creating video programs, which is shown in Fig. 3, provides for the transmission of created television programs through telecommunication networks and provides the possibility for interactive interaction between user-viewers and the objects of the video program and/or the participant. In the system according to Fig. 3, a second output of the unit 5 for combining the images is coupled to the telecommunication network 14 through a corresponding connection unit 15, for example, modem. The means 3 for forming an image is coupled by two-way communication to the connection unit 15. The telecommunication network 14 is connected to a user device 16 which comprises a corresponding connection unit, the functions of which in the variant under consideration are performed by a processor device 17, outputs of which being connected to an input of a user means 18 for forming an image and to one of the inputs of a user unit 19 for combining images. An output of the forming means 18 is connected to another input of the unit 19 for combining images, an output of which is connected to an input of a unit 20 for display of a combined image. The user device 16 also comprises a control unit 21

connected to the input of the processor device 17 to input the user's control commands, which may be sent through the telecommunication network 14 and the connection unit 15 into the studio.

In the embodiment of the claimed system, which provides for transmission of a signal of a combined image from the studio through the air, through a cable or through other channels, the system comprises a corresponding receiving device with an antenna 22. In this case a combined image and data on the parameters of an image formed by a computer in the studio come through the air to the user. Using this data at the user device 16, the user may interact, using the control unit 21, with objects meant to be controlled by the user. Wherein, a return signal from the user, containing control commands, may be sent to the studio through the telecommunication network 14.

In the embodiment of the system, which is presented in Fig. 3, the system also comprises a unit 23 for processing the user's control commands, which unit is coupled by two-way communication to the connection unit 15 and to the means 3 for forming images. Users' control commands may be used to obtain individual information from the users: to control objects generated with the aid of computer software, to determine users' ratings, to distribute opinions of groups of users, their preferences, individual evaluation of users' actions, organization of a competition between an actor and one or several distant users. In accordance with information concerning the users, individualized special information may be sent to the user devices: tasks, advertisements, evaluation, proposals, results of processing generalized information from all of the users. Such individual information may be displayed for each user in separate windows of an image common to all.

The system for creating video programs in a video conference mode, shown in Fig. 4, provides the possibility for several partners to see each other during interaction with objects of computer programs, which are displayed to them on a background of a video image of the partner. The system comprises video cameras 1, 1' for shooting participants 2, 2', respectively, means 3, 3' for forming an image with a computer, means 4, 4' for displaying video images received from the network 14 and formed images to participants of a video conference, units 5, 5' for combining video images of participants of the video conference and the formed images, and units 15, 15' for connecting to the network 14, which are coupled to the units 5, 5' for combining and to the means 3, 3' for forming an image.

The system for creating video programs, made in accordance with the invention, operates in the following manner.

A participant 2, who is shot by at least one television camera 1, is placed in a television studio as shown in Fig. 1. As a rule, the participant is shot full face, sitting at a table, as hosts of television programs are usually shot, or in full height, providing a participant with the possibility of moving in a limited space. Wherein, simultaneously with the shooting, images are displayed to a participant of the video program which are formed by the means 3, for example, a computer game. The video image of the participant, obtained by the video camera, and an image from the means 3 for forming are combined in the unit 5 for combining images. The images formed by the means 3 are actually the result of operations carried out in a computer by a corresponding program and, as a rule, consists of two parts (two layers): a background image and objects. The background image and the objects, in turn, may themselves also consist of several layers. With the aid of a corresponding program unit, any layer may be separately output. The image of the objects is separated from the background image and in the unit 5 for combining is superimposed on the video image of the participant, which is formed by the video camera. Both the image of the objects and the background image made be made semitransparent, alternating pixels of the image and transparent pixels. When such an image is superimposed on the video image of a user, the latter will be seen by viewers through the image formed by the computer. If the images are combined by television analogue mixers, then those parts of the image being formed by the computer, which should be transparent, are filled with a chromakey color so as to use the rear-projection method during superimposition. In that case the chromakey color is removed, and the place which it occupied in the image becomes transparent. Combining the images is carried out in such a manner that a viewer sees a participant watching the objects formed by the means 3. When the images are combined any of the layers of the images may be made semitransparent, i.e. the degree of its transparency may be changed from zero to one during the solution of certain problems. Such an adjustment of the degree of transparency of one of the layers may be accomplished in the studio by a director or in a user device by a user. Wherewith, a viewer, watching the combined image, gets the impression of participation. It seems to the viewer that the objects formed by the computer and displayed on the screen are between the viewer and the participant of the video program. So that the means 4 for displaying would not interfere with the shooting of the participant and would not fall within the field of view of the video camera, the means 4 is made as shown in Figs. 2 (a)-(d). The images formed by the means 3, which is outside the field of view of the video camera, are displayed to the participant, who is a user of the means 4 for

displaying, in such a manner that the images would not block the television camera from the participant being shot.

As shown in Fig. 2 (a), at least an image of the objects formed by the means 3 is displayed on the screen 7. The glass plate (or semitransparent mirror) 8 mounted above the screen 7 (at the side or above the screen) provides for forming an image 7', which is a reflection of the screen 7, transverse to the axis O-O' passing along the line of shooting a participant (or participants) of the video program. In this case, a participant 2 watches the image-reflection 7' of the image from the screen 7. Wherein, the Applicant's gaze will be simultaneously directed to the screen 7' and towards the video camera. If the image formed by the computer on the screen 7 is temporarily turned off, the participant may concentrate his gaze on the lens of the television camera as in traditional shooting. Taking into account the dimensions of the screen 7, the distance from the plane on which the image 7' is formed to the participant 2, the distance from the participant 2 to the video camera 1 and its parameters, and the laws of perspectivity during the creation of images, it is possible to ensure exact coincidence of the participant's reaction to the image 7' in the combined image for television viewers (for example, directing his gaze to an object or moving a hand over the sensor screen after the object being displayed). An image containing a caption is corrected in such a manner that the captions on the combined image, displayed to the viewers and displayed to the participant in the plane of forming the image 7', would look natural.

When a participant is shot in full height (Fig. 2 [b] - view from above) an image on a large translucent screen 7 is formed with the aid of the projector 9, which is connected to the means 3 for forming an image. A participant 2 watches the image 7', an image from the screen 7 reflected from the semitransparent mirror 8.

If the creation of video images is meant for one or a few users, the video conference mode may be realized, wherein users do not only see each other but may control the objects which are displayed to them and which they observe between themselves and a partner. In accordance with Fig. 2 (c), the video conference mode is realized with the use of a computer and a video camera, wherein software provides for the display of a partner's image on a background of objects generated by the means for forming images (by a computer), not in a separate window. Partners, participating in the video conference, see one and the same objects in front of them, each from its own side, and they may jointly discuss these objects or introduce changes therein. Such a variant of realizing video conferences is especially effective in the case of playing computer games

with a partner or as a computer variant of realization of "table" games. It will seem to the partners that they are playing at one table, they will see and hear each other, see each other's reaction to corresponding moves, even though at that moment the partners will be separated by thousands of kilometers. In outside-the-studio conditions, it is also easy to realize the variant described above with reflection of an image from the semitransparent mirror 8 with use of a "notebook" type computer (Fig. 2 [d]).

The embodiment of the system providing for interactive interaction between a viewer with objects generated by a computer and/or with a participant (Fig. 3) operates in the following manner. A signal, containing a video image of a participant and data necessary to form an image with a user's computer, is sent from the studio through the telecommunication network 14 to a user device 16. A user means 18 for forming forms an image of the objects. Then, using the user unit 19 for combining, the video image of a participant of a video program, which image is sent over the network, and the image of objects, which is formed by the means 18, are combined, putting the image of the objects over the video image of the participant. Then the combined image is displayed to a viewer-user with the aid of the means 20 for displaying. If the viewer-user uses a control unit 21, then the means 18 for forming forms an image of the objects, taking into account the data received from the studio and the control commands from the unit 21. Wherewith, the control commands are sent to the studio and are processed in the studio by the unit 23. Different variants for providing a viewer with interactive interaction with objects formed by a computer are possible. For example, back coupling to a studio through a telecommunication network may be used. Without use of such back coupling, the viewer will receive the combined image and data on the image formed by the computer through, for example, the air or by cable. The means necessary in the majority of cases for synchronizing, digitizing, archiving, compressing images and for reverse operations are not shown in the drawings.

The system for creating video programs in a video conference mode (Fig. 4) provides users remotely spaced one from another with the possibility to observe objects formed by a computer, as if between each other. In order to do this the video image of one user 2, shot by a camera 1, is sent through a telecommunication network 14 to be combined with objects formed by a means 3' of another user 2', after which the objects formed by the means 3' are superimposed on the video image of the user 2 in the unit 5' for combining the images. The same operations are simultaneously carried out for the other user 2'. Wherein, the image formed by the computer is made transparent over some areas and is

superimposed on the video image of the other user. Each user will thus see the objects formed by the computer between himself and the partner of the video conference.

In a preferable embodiment of the invention, a video camera is used in the studio, the video camera shooting through a semitransparent mirror (glass plate) 8 which is mounted at an angle of 45 degrees to the shooting line O-O' and reflects to the participant the screen of a monitor on which a computer game, which the participant is playing during the shooting, is displayed. Wherewith, the shooting of the participant may be carried out on a chromakey background, and the display of the objects of the computer game and the participant - on a background formed by that same program which forms the objects of the computer program, or on any other background which may be changed at any moment of the shooting. Combining the objects formed by the computer with the video image of the user is carried out in a real-time mode. Wherein, the objects formed by the computer are superimposed on the video image of the participant. And if the participant is shot on a chromakey background, then, in turn, the video image of the participant (with an already transparent background) is superimposed on the background image.

Traditional computer and video games may be used as the software used in the shooting. In order to do this, small changes, providing for the separate output of an image of the objects and a background image, should be introduced into those games.

It should be noted that the concept "video programs," which is used in the instant specification, should be understood to be wider than programs for standard television broadcasting. Video programs, created by the method according to the instant invention may be inserted into computer networks and transmitted through computer networks, including with the presentation of the possibility for interactive interaction with a "viewer." The claimed method may be used to organize video conferences, create educational video programs and video programs for studying the reaction of users.

Use of the claimed method is especially useful for making a study and optimization of user interfaces of computer programs so that the programs would be intuitively understood and convenient for users. It is possible to track and time all the actions of a user while working with a computer with a program, a certain interface, and a complete record of his actions. The user himself cannot control and consciously describe all his actions. Quite often these actions are carried out subconsciously. Many reactions are not controlled by the user himself, for example, small movements of his eyes and reflex reactions. Special sensors may be used to register the area toward which the user's gaze is directed, and this area will be displayed on a corresponding place in the image of the

objects. A person's eye may see clearly and sharply only a very small area which is in the center of the angle of view, the so-called Foll zone. The image as a whole seems to a person to be sharp due to unconscious micromovements of the eye. Wherein, a person's sight especially keenly reacts to changes in the image being observed, constantly sending information thereon into the brain and receiving in response control commands at the subconscious level. In the video programs created in accordance with the present invention, the majority of a user's reactions, conscious and unconscious, will be registered. Further improvement of computer programs, taking the results of studies of video materials into account, will aid to increase the volume of the sale of these programs, to increase their competitiveness in the market, as a result of selection of optimum functions and user interface. Optimization of the interface and the structure of a program in turn will save the time and simplify the work done by a final user, increase the productivity of his labor. Further advantage during an examination of video protocols (video programs) of the user's work with a computer may be provided by use of sensors of a user's eye movements, emotional reaction etc., and a corresponding input of their indications to the video program.

Industrial Applicability

The invention corresponding to the claimed method may be used for medical and professional testing and training of users. In the case of specialists in psychophysiological testing, the possibility is provided for registering not only the actions of those being tested, but also to study the reaction of users, including subconscious reaction recorded in the form of a video program. The reactions of users on a background of stimulator images displayed to them and data on the dynamic monitoring of the state of users being tested are recorded in the video program. Wherewith, monitoring of the pyschophysiological condition of the user being tested may be carried out with different types of sensors: a sensor of the emotional condition ("lie detector," polygraph), blood pressure, pulse, and they may be displayed on the same screen. Such a method may be more widely used, not only when a user works with a computer, but also during a study of a viewer's reaction while the viewer is watching a movie or an animated cartoon. For this, the image of a video film is reproduced instead of an image generated by a computer. The combined results of a study of the reactions of a representative selection of viewers to a certain video film in accordance with the invention, actually provide an objective evaluation of the video film itself on the basis of objective psychophysiological data. A study of the reactions of

viewers in control groups prior to releasing the film for wide demonstration makes it possible to obtain data for analysis of the reaction of the mass of viewers and to more exactly chose the best variants for development of the plot and for editing to obtain predictable results. Achievement of the necessary indications, in accordance with the results of the studies, will help to improve the drawing power of films and to obtain the necessary reaction of the mass viewer. Where necessary, information transmitting the reaction of a viewer to a separate concrete frame may be obtained, this making it possible to track the movement of a viewer's gaze over the plane of a displayed image.

Set of Claims

1 A method for creating video programs, which is based on video shooting and forming computer images, wherein

an image is formed by a computer, which includes an image of objects in the foreground and a background image,

a participant of a video program is shot with a video camera and a corresponding video image is obtained,

an output video signal is formed with use of the video image of the participant of the video program and the image formed by the computer,

characterized in that

at least objects of the foreground of the image formed by the computer are displayed to the participant of the video program,

shooting the participant of the video program is carried out in the process of displaying at least objects of the foreground of the image formed by the computer to the participant of the video program with an angle of approach of the shooting providing the possibility of reproducing in the obtained video image the reaction of the participant of the video program to the displayed objects of the computer program,

the image formed by the computer is combined with the video image of the participant of the video program by superimposing an image of at least the objects of the foreground on the video image of the participant, and the combined image is used for subsequent display to a user.

2. A method according to claim 1, characterized in that

the shooting of the participant of the video program is carried out on a chromakey background, and when the image of the objects of the foreground, which are formed by the computer, is combined with the video image of the participant of the video program, the chromakey background is replaced with said background image or with any other image.

3. A method according to claim 1, characterized in that the participant of the video program is provided with the possibility of interacting with the displayed objects formed by the computer and of changing the image of said objects.

4. A method according to any one of claims 1-3, characterized in that at least the video image of a participant of a video program, which is shot by a video camera in a studio, and data necessary for forming an image with a computer are transmitted via a telecommunication network to a user device,

an image is formed in the user device on the basis of data received from the studio, this image including an image of the objects of the foreground and a background image,

the video image of the participant of the video program and the image formed by the user device are combined by superimposing the image of the objects of the foreground onto the video image of the participant,

the combined image is displayed to the user.

5. A method according to claim 1, characterized in that

control commands are input to the user device and the obtained control commands are used to form the image in the user device, the control commands are transmitted through the telecommunication network into the studio and the control commands received in the studio are used while forming an image with the computer.

6. A method according to claim 5, characterized in that

shooting a user is effected with a video camera,

a video image of the user is transmitted through a telecommunication network to the studio,

the video image of the user received in the studio is combined with objects of the foreground of the image formed by the computer in the studio by superimposing an image of said objects of the foreground on the video image of the user,

the combined image is displayed to a participant of the video program.

7. A method according to claim 6, characterized in that

the combined video image of the user and the objects of the foreground of the image formed by the computer is used for display to other users.

8. A system for creating video programs, combining shooting with a video camera and forming images with a computer, primarily television programs, the system comprising

a video camera for shooting a participant of a video program and

a means for forming an image including objects of the foreground and a background image,

the video camera and the means being disposed in a studio,

characterized in that it comprises

a means for displaying at least objects of the foreground to the participant, the means for displaying being connected to the means for forming an image, and

a means for combining images, a first input of which is connected to an output of the video camera, a second input to an output of the means for forming an image, wherein

said means for combining images is made with the possibility of superimposing an image of objects of the foreground on a video image of the participant.

9. A system according to claim 8, characterized in that said means for displaying is made so that the image displayed to the participant intersects the line of shooting the participant with the video camera.

10. A system according to claim 9, characterized in that said means for displaying comprises

a screen, coupled to a means for forming images and disposed outside the limits of the field of view of the video camera,

a semitransparent mirror, optically conjugated with said screen and disposed on the line of shooting the participant with the video camera, at an angle to said line to provide the possibility of forming a reflected image to be displayed to the participant in a plane substantially perpendicular to the line of shooting.

11. A system according to any one of claims 8-10, characterized in that it comprises a means for interactive interaction of the participant with objects of the displayed image, the means being coupled to the means for forming an image.

12. A system according to claim 11, characterized in that said means for interactive interaction is made in the form of a means for determining the position and orientation of the participant.

13. A system according to any one of claims 8-12, characterized in that it comprises

a channel of a telecommunication network,

a connection unit coupled by two-way communication to the channel of the telecommunication network, to the means for forming images and to the means for combining images,

at least one user device comprising

a user means for forming an image of the objects in the foreground and a background image,

a user connection unit coupled by two-way communication to the channel of the telecommunication network and to the user means for forming an image,

a user means for combining images of the foreground with a video image of a participant of a video program, sent over the channel of the telecommunication network, and made with the possibility of superimposing the image of the objects in the foreground on the video image of a participant of the video program, and a user means for displaying the combined image,

wherein a first input of the user means for combining the images is connected to an output of the user connection unit, a second input is connected to an output of the means for forming images, and an output is connected to an input of the unit for displaying the combined image.

14. A system according to claim 13, characterized in that it additionally comprises a user control unit, an output of which is connected to a corresponding input of the user connection unit, and a user control command processing unit disposed in the studio and connected by two-way communication to the connection unit and to the means for forming an image.

15. A method for creating video programs in a video conference mode, based on video shooting and forming images with a computer, wherein

an image is formed by computers for each of at least two spatially separated participants of a video program, the image including an image of objects of the foreground and a background image, wherein said computers are linked through a telecommunication network,

at least the image of the foreground objects, formed by a computer, is displayed to each of the participants of the video program,

the possibility of interacting with the displayed objects and changing the displayed objects is provided to each of the participants of the video program,

shooting each of at least two participants of the video program is carried out with a video camera,

a video image of each participant is sent through the telecommunication network and displayed to the other participant,

characterized in that

the shooting of each participant of the video program is carried out in the process of the participant's interaction with at least the objects of the foreground of the image formed by a computer,

the image of the foreground objects which are displayed to a particular participant is combined for each of the participants with a received video image of another participant of the video program by superimposing said image of the foreground objects on said received video image of a participant of the video program and

a combined video image is displayed to each of the participants of the video program.

16. A method according to claim 15, characterized in that the background, on which a participant of the video program is shot with a video camera, is cleaned from the received video image and replaced with a background image formed by a computer or with any other image.

17. A method for creating video programs for registering the reactions of a user to an image displayed to a user for studying and optimizing interfaces of computer programs and editing video films, wherein

an image is formed,

the formed image is displayed to the user,

the user is shot with a video camera and a corresponding video image is obtained,

an output video signal is formed with use of the video image of the user and the formed image for subsequent analysis,

characterized in that

the shooting of the user is carried out in the process of displaying the formed image to the user with an angle of approach of the shooting which provides the possibility of reproducing in the obtained video image a reaction of the user to the image displayed to the user,

transparent zones are created in the image being formed,

the formed image is combined with the video image of the user by superimposing the formed image with the transparent zones on the video image of the user.

18. A method according to claim 17, characterized in that the image is formed by a computer, wherein the image comprises an image of the objects and a background image, the background image being formed transparent when combined with the video image of the user.

19. A method according to claim 18, characterized in that the user is provided with the possibility of interacting with the objects of the displayed image formed by the computer.

20. A method according to any one of claims 17-19, characterized in that data of the psychophysiological condition of a user in the process of interaction with the displayed objects of the image formed by the computer are additionally registered.

21. A method according to claim 20, characterized in that the indications of the registered data are combined with the images of the video program.

Abstract

The invention relates to television, interactive television, user interfaces, video conferences and may be used in the creation of video programs with interactive interaction between participants of video programs and objects generated by a computer program. The technical result is enhancement of the reliability and quality of the display to viewers of images, formed by a computer, and the reaction of participants of a video program to a change of the images. A participant 2 of a video program is shot by a video camera 1, wherein an image, formed by a means 3 (computer), is simultaneously displayed to the participant 2 on the line of shooting with the video camera. At least an image of objects of a forward plan, which is formed by the means 3, is combined in the unit for combining images, these objects being put on the video image of the participant, obtained by the video camera 2, in such a manner, that a viewer sees the participant 2, who is watching the objects of the forward plan and interacting with them with the aid of a means 6.

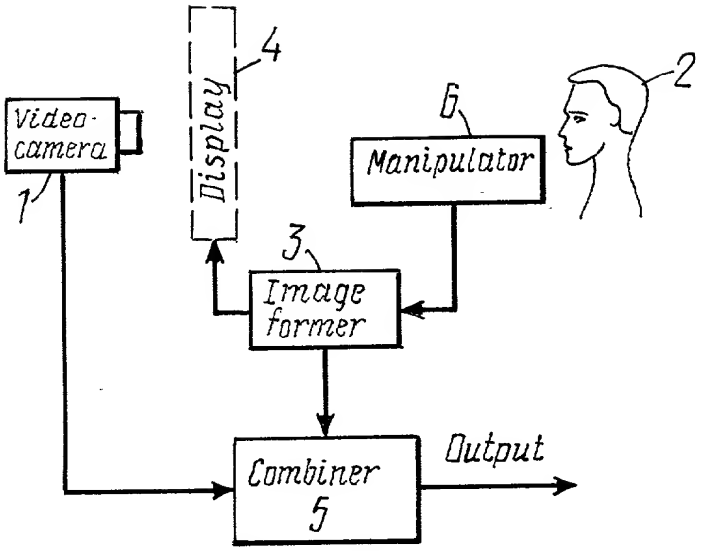

FIG. 1

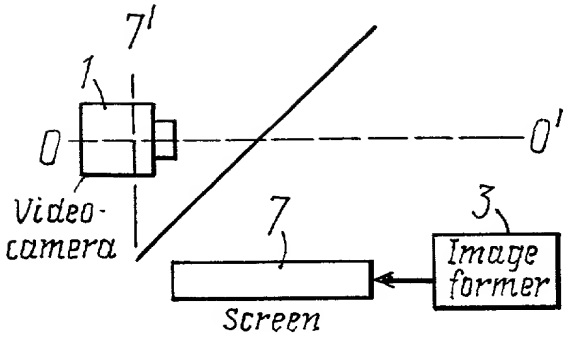

FIG. 2a

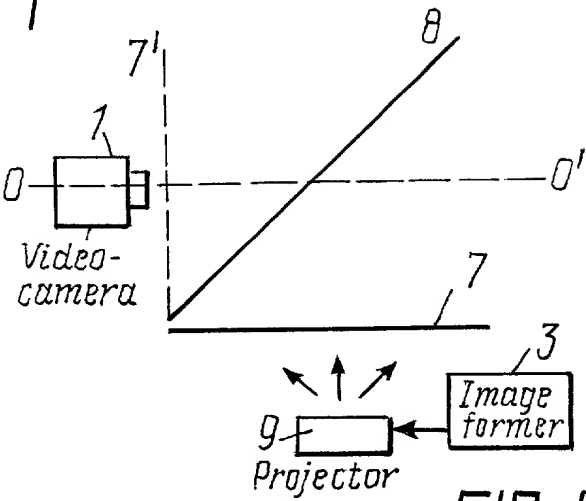

FIG. 2b

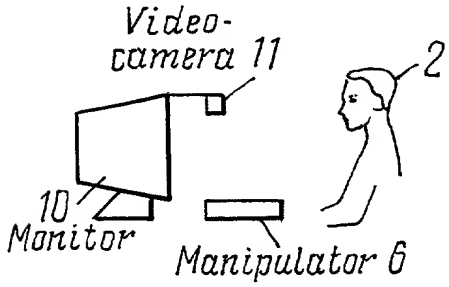

FIG. 2c

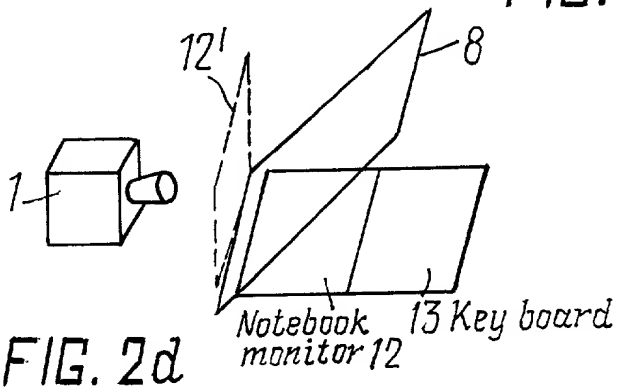

FIG. 2d

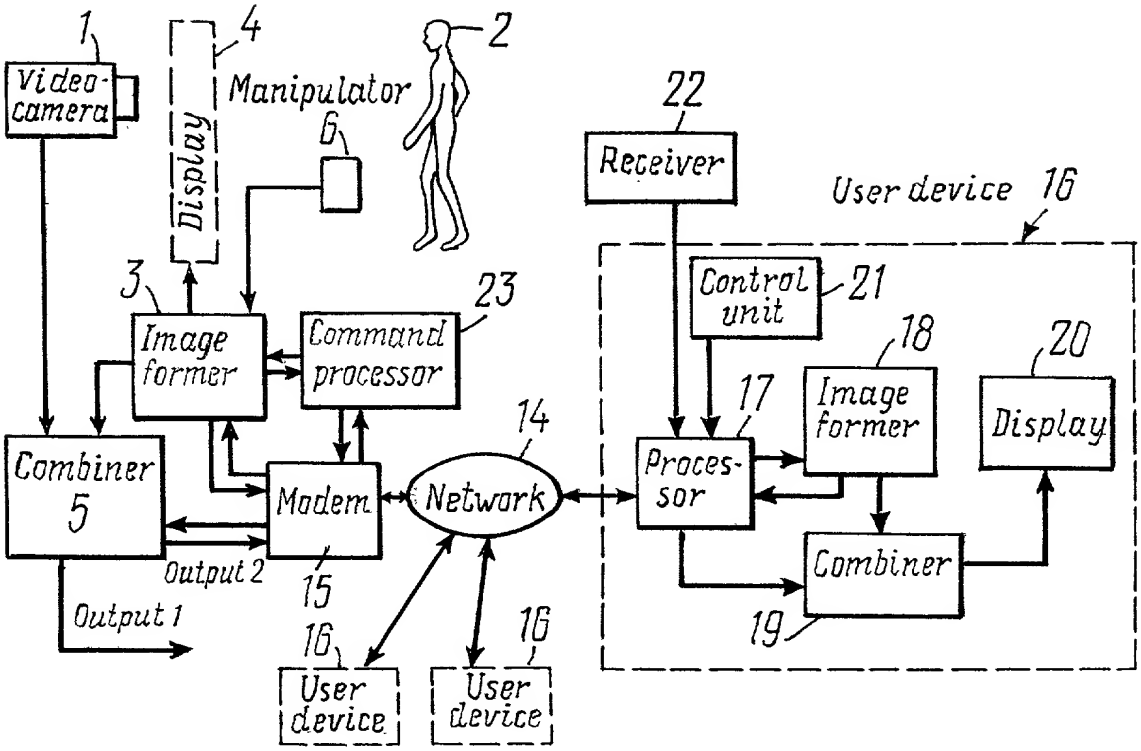

FIG. 3

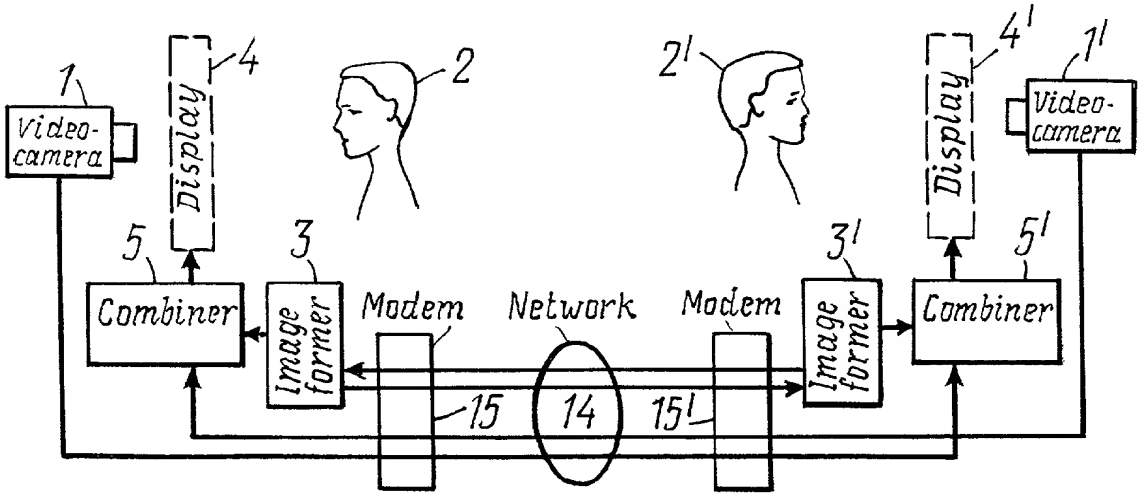

FIG. 4

PATENT APPLICATION
DOCKET NO.: 47254-0004

RULES 63 AND 67 (37 C.F.R. 1.63 and 1.67)
DECLARATION AND POWER OF ATTORNEY

FOR UTILITY/DESIGN/CIP/PCT NATIONAL APPLICATIONS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: METHOD FOR CREATING VIDEO PROGRAMS (VARIANTS) AND SYSTEM FOR IMPLEMENTING THE METHOD, the specification of which: (mark only one)

X (a) is attached hereto.

___ (b) was filed on _____ as Application Serial No. _____ and was amended on ___ (if applicable) PCT/RU99/00319 02.09.1999

X (c) was filed as PCT International Application No. PCT/___ on ____ and was amended on ___ (if applicable).

___ (d) was filed on ___ as Application Serial No. ____ and was issued a Notice of Allowance on ___.

___ (e) was filed on ___ and bearing attorney docket number ___.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above or as allowed as indicated above.

I acknowledge the duty to disclose all information known to me to be material to the patentability of this application as defined in 37 CFR § 1.56. If this is a continuation-in-part (CIP) application, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability of the application as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this CIP application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application

on which my priority is claimed or, (2) if no priority is claimed, before the filing date of this application:

PRIOR FOREIGN PATENTS

Number	Country	Month/Day/Year Filed	Date first laid-open or Published	Date patented or Granted	Priority Claimed Yes	No
98116685	Russia	09/04/1998				

I hereby claim the benefit under 35 U.S.C. § 120/365 of any United States application(s) listed below and PCT international applications listed above or below:

PRIOR U.S. OR PCT APPLICATIONS

Application No. (series code/serial no.)	Month/Day/Year Filed	Status(pending, abandoned, patented)

I hereby appoint:

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BENJAMIN J BAI, Reg No 43,481
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STUART D DWORK, Reg No 31,103
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ALAN R. THIELE, Reg No 30,694
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RAYMOND VAN DYKE, Reg No 34,746
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GERALD T WELCH, Reg No 30,332
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all of the firm of **JENKENS & GILCHRIST, P.C.**, 3200 Fountain Place, 1445 Ross Avenue, Dallas, Texas 75202-2799, as my attorneys and/or agents, with full power of substitution and revocation, to prosecute this application, provisionals thereof, continuations, continuations-in-part, divisionals, appeals, reissues, substitutions, and extensions thereof and to transact all business in the United States Patent and Trademark Office connected therewith, to appoint any individuals under an associate power of attorney and to file and prosecute any international patent application filed thereon before any international authorities, and I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization who/which first sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct them in writing to the contrary.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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